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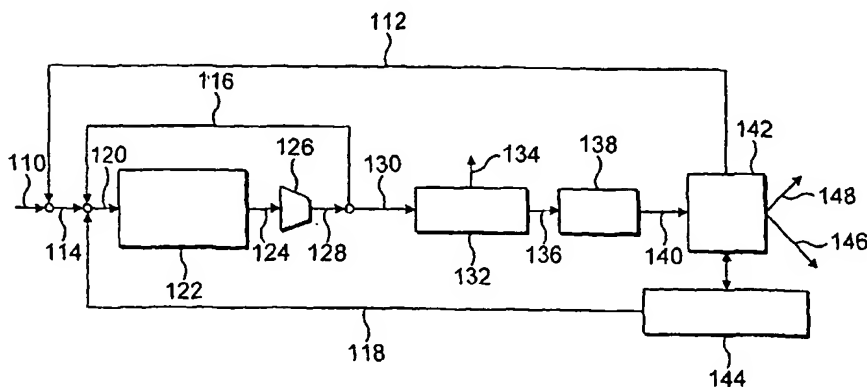
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(54) Title: **PROCESS AND APPARATUS FOR THE PRODUCTION OF HYDROCARBON COMPOUNDS FROM METHANE**



(57) **Abstract:** Higher molecular weight hydrocarbon compounds or oxygenates are produced from a gas comprising methane in a process comprising the steps of generating synthesis gas ("syngas") comprising carbon monoxide and hydrogen by reaction of a gas comprising methane with steam and/or an oxidant gas comprising oxygen, producing higher molecular weight hydrocarbon compounds or oxygenates in a syngas conversion process, removing offgas comprising unreacted hydrogen and unreacted carbon monoxide from said syngas conversion process and separating cryogenically unreacted hydrogen from said offgas or from a gas derived therefrom to produce separated hydrogen product that is substantially free of unreacted carbon monoxide and a first cryogenic liquid comprising unreacted carbon monoxide. The unreacted hydrogen is preferably separated from the offgas in a liquid methane wash column. Two advantages of this process are that this cryogenic separation process is more efficient than known pressure swing absorption techniques and that the concentration of carbon monoxide in the separated hydrogen product is sufficiently small that the separated hydrogen product may be used in the hydrogenation of a wax fraction of the higher molecular weight hydrocarbon compounds without further purification or processing.

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